

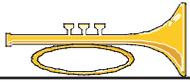
ON THE AIR!

A Quarterly Newsletter of the
NOAA Aeronomy Laboratory



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ANNOUNCEMENTS

AL Seminar Series

Here's a sample of upcoming talks in the Aeronomy Lab's seminar series:

- November 13 – Greg Huey (Georgia Tech)
- January 8 – Michael Mills (CU-Boulder)
- February 5 – Jim Smith (NCAR)

New Seminar Coordinator: Ned Lovejoy is the new seminar coordinator for the Aeronomy Laboratory, commencing with the fall 2002 schedule. Greg Frost previously served in this post over the last two years. Debe

Fisher will continue to assist with the seminar notices. A big "thanks" to Greg and thanks—in advance—to Ned and Debe for their help with this important job during the next two years.

New Safety Officer: Jim Roberts is the new Safety Officer for the Aeronomy Laboratory. Mary Gilles previously served as the Safety Officer for the past three years. We all appreciate Mary and Jim's work in helping the Aeronomy Laboratory provide a safe working environment that is in accordance with the high standards of NOAA and DOC.



AWARDS AND RECOGNITION



Aeronomy Lab scientists were recognized with two of the Outstanding Scientific Paper awards in the recent NOAA Research (OAR) annual competition:

- D.W. Fahey** and U. Schumann, "Aviation-Produced Aerosols and Cloudiness," Chapter 3 in *Aviation and the Global Atmosphere*, a special report of the Intergovernmental Panel on Climate Change, Cambridge University Press, 1999.
[awarded in the Review Paper category]

This review paper is one of the ten technical chapters of the first international scientific state-of-understanding assessment of the impacts of aviation on global climate and the ozone layer. The assessment, *Aviation and the Global Atmosphere*, is a Special Report of the Intergovernmental Panel on Climate Change (IPCC) that assesses the state of understanding of the relevant science of the atmosphere, aviation technology, and socio-economic issues associated with potential atmospheric impacts of both subsonic and supersonic aircraft. This chapter by Fahey and Schumann is the most comprehensive, quantitative treatment ever done on the topic.

- S.J. Oltmans, H. Vomel, D.J. Hofmann, **K.H. Rosenlof**, and D. Kley, "The increase in strato-

spheric water vapor from balloonborne, frostpoint hygrometer measurements at Washington, D.C., and Boulder, Colorado," *Geophysical Research Letters*, 27, 3453-3456, 2000.

[awarded in the Research Paper category]

This paper, nominated by CMDL, provides a comprehensive and convincing analysis of trends in stratospheric water vapor. Water vapor is a major greenhouse gas, and a lack of understanding about its abundance and trends in the atmosphere has been a key uncertainty in the prediction of climate change. The findings of the paper were a fundamental underpinning of the first international assessment of the understanding of water vapor, published in December 2000 under the auspices of the World Climate Research Program (WCRP) project on Stratospheric Processes and Their Role in Climate (SPARC).

Tom Ryerson was selected to receive the Editors' Citation for Excellence in Refereeing for the *Journal of Geophysical Research*. The citation recognizes Tom for especially commendable reviews of submitted manuscripts. The award was announced at the 2002 Spring Meeting of AGU and was described in the 24 September issue of *EOS Transactions*.

Aeronomy Lab Research Helps to Resolve Another Antarctic Dilemma (The Antarctic Stratosphere Gets Pushy)

The remoteness of Antarctica has long made that continent a land of mysteries and an irresistible destination for explorers throughout history. The Antarctic atmosphere has lived up to the continent's reputation, producing in the mid-1980s one of the biggest surprises in the geophysical sciences: the Antarctic springtime ozone hole. Aeronomy Laboratory researchers were pivotal in resolving scientific questions about the cause of the ozone hole. The research involved several AL researchers and their colleagues worldwide participating in field, laboratory, and modeling research, and notably Susan Solomon suggesting a theory regarding the cause that was ultimately shown to be a key step in the phenomenon. More recently, the Antarctic atmosphere has exhibited new puzzling behavior. And once again, Aeronomy Laboratory research has helped to explain the underlying science.

The latest Antarctic puzzler has been the observation of recent warming behavior in the region of the Antarctic Peninsula and, simultaneously, the observation of cooling in the Antarctic interior. Thus, even as the Peninsula's sea ice retreated during recent years, the continental interior has cooled. While some have cited the Peninsula observations as evidence of global warming, others have stated that the continental cooling is evidence that there is no global warming. Susan Solomon and colleague David Thompson of Colorado State University examined a 30-year dataset of observations of meteorological variables and ozone to explore the puzzling behavior. They found that in order to explain the surface temperature behavior, they had to look *up*—indeed, they looked not only at the data for the troposphere (the lowermost layer of the atmosphere), but they also looked at the stratosphere, the layer from 10 to 50 kilometers above the surface. What emerged from the study was the first evidence of a direct link between ozone depletion and climate change.

In the Antarctic stratosphere, air swirls around the pole in winter and creates what is known as a “vortex.” This vortex has become colder and more intense (“tighter”) in recent years because of the chlorine- and bromine-catalyzed destruction of stratospheric ozone (ozone is the stratosphere's “heating blanket,” so ozone loss has a cooling effect). What Thompson and Solomon noticed is that the Antarctic vortex circulation has recently strengthened and extended downward into the troposphere. The result is a cooler lower atmosphere that extends well into the summer months, thereby cooling the continental interior. At the same time, the stronger, “tighter” vortex keeps intrusions of cold air from reaching the periphery of the continent, resulting in the warming of the outer Peninsular areas.

These results suggest that the observed changes in surface temperatures are highly likely to have been linked to the spectacular cooling of the stratosphere caused by the ozone hole. The finding is a surprising one, because it wasn't thought that the stratosphere could instigate changes in the weightier troposphere. Thompson and Solomon's work has revealed a new chemistry/climate linkage and provided yet another example of how it is, indeed, “one atmosphere” here on Planet Earth.



WHAT'S UP WITH PEOPLE

In the Atmospheric Chemical Kinetics group, **Mary Gilles** left in June to take a position at Lawrence Berkeley Laboratories. In July, **Anders Pettersson** joined the group as a research postdoc. Anders received his Physics Ph.D. from Stockholms Universitet in October, 2001.

In the Computer Network Resources Group, **Gabi Accatino** started with the group in June. Gabi is a graduate of California Polytechnic State University with a masters in industrial engineering.

In the Tropical Dynamics & Climate group, Leslie Harten served as the science mentor for **Matt Coleman**, who is a senior at the University of Virginia this fall. He is one of the protégés in the Significant Opportunities in Atmospheric Research and Science (SOARS) program. **Katherine Straub** left the group to take a position teaching at Susquahanna University in Selinsgrove, PA.

Stephen Reid left the Meteorological Chemistry group in late September to take a new position as the Associate Program

Director for the Climate Dynamics Program of the National Science Foundation in Washington, DC.

Dale Kellogg began in August as the Executive Administrator of the Working Group I Technical Support Unit of the Intergovernmental Panel on Climate Change (IPCC), which is housed at the Aeronomy Lab.



HOME and AWAY

The Tropospheric Chemistry group was invited by Greg Huey of the Georgia Institute of Technology for an informal intercomparison of ammonia chemical ionization mass spectrometer (CIMS) instrument measurements between these two groups. The experiment took place from July 22 until September 5.

The Tropical Dynamics & Climate group participated in the Disdrometer Evaluation Experiment (DEVEX) in Iowa City this summer, in collaboration with the University of Iowa's Institute for Hydraulics Research. The campaign lasted until fall, allowing measurements of both warm and cold season precipitation.



- **To Decisionmakers:** On June 5, Dan Albritton, Ravi, and Susan Solomon participated in the Aeronomy Lab “mini-review” at OAR headquarters in Silver Spring, MD... On June 6-7, Dan Albritton and Jim Meagher visited the Environmental Protection Agency in Research Triangle Park, NC, to discuss AL air quality research results... Dan Albritton, Cathy Burgdorf, Chris Ennis, David Fahey, Ravi, Susan Solomon, and Jeanne Waters participated in the Montreal Protocol Science Assessment Panel’s Review Meeting held in Les Diablerets, Switzerland, from June 24-28. It was the final review meeting for the 2002 ozone-layer assessment, which is being prepared for publication in early 2003... On August 21-22, Susan Solomon served on a review panel to evaluate the ozone-layer implications of a new fire extinguishing agent, iodotrifluoromethane (CF₃I), that has been proposed to replace the halon-based system used by the Air Force. The panel’s scientific findings were a key consideration in the subsequent Air Force decision not to use CF₃I.

- **In NOAA Research Planning Meetings:** In May and June, AL and FSL scientists participated in meetings regarding the planning for the High Resolution Air Quality and Temperature Forecasting pilot program research. Participating were Dan Albritton, Jim Meagher, Sandy MacDonald, Tom Schlatter, and Bill Bendel... Jim Meagher attended a meeting August 12-13 in Washington, DC, to prepare a draft of an Air Quality Forecasting overview article, which will appear in the December issue of the Air and Waste Management Association’s *Environmental Manager*... On August 26-27 in Washington, DC, Dan Albritton worked with Jim Mahoney (Assistant Secretary of Commerce for Oceans and Atmosphere) on NOAA and interagency research planning efforts related to the President’s Climate Change Research Initiative.

To the Scientific Community: Venues included:

- **Scientific Conferences and Symposia:** Jim Meagher gave a talk at the Interactions of Urban Pollution with the Regional and Global Environment meeting May 7-9 at NASA Goddard, MD... In May, George Kiladis, Katherine Straub, and Eric Ray participated in the 25th Conference on Hurricanes and Tropical Meteorology, sponsored by the American Meteorological Society in San Diego, CA... Paul Goldan attended the Chemical Instrumentation Tropospheric Experiment (CITE) Conference in May held in Hampton, VA... In May, Susan Solomon, Ken Gage, George Reid, and Stephen Reid presented talks at the AGU’s 2002 Spring Meeting held in Washington, DC... From June 2-7, Mary Gilles participated in the annual Photochemistry Conference held in Miami, FL... From July 1-5, Wally Clark took part in the Program in Electromagnetic Research Symposium (PIERS) 2002 held in Cambridge, MA... In July, both Wally

Clark and Ken Gage took part in the First Tropical Rainfall Measuring Mission (TRMM) Conference held in Honolulu, HI... In August, several scientists from AL participated in the Chemical and Optical Properties of Atmospheric Aerosols Conference, held in Telluride, CO... Again in August, several AL scientists participated in the American Chemical Society meeting in Boston, MA... During the last week in August, Tomasz Gierczak, Ravi, Harald Stark, and Ranajit Talukdar took part in the Gas Kinetics meeting in Düsseldorf, Germany.

- **Research/Planning Workshops:** From April 30 to May 3, Dan Albritton attended the Air Pollution as a Climate Forcing workshop in Honolulu, HI. He gave the invited overview talk at the meeting... From April 30 to May 4, John Daniel participated in the NATO Science Programme Advanced Research Workshop series held in Paris, France... Tom VanZandt attended the Jicamarca radar observatory workshop from May 20-23 in Lima, Peru... Susan Solomon attended the IPCC workshop on Changes in Extreme Weather and Climate Events held in Beijing, China, from June 8-14... George Reid participated in the Solar Radiation and Climate Experiment (SORCE) Science working group meeting in July held in Steamboat Springs, CO... From August 18-23, George Reid attended the Mesospheric Clouds workshop in Perth, Scotland... Dan Albritton delivered his second teaching lecture in the series of Climate Variability Workshops organized by the National Weather Service

On July 23, Dan Albritton participated with NOAA Administrator VADM Conrad C. Lautenbacher and DOC Assistant Secretary for Oceans and Atmosphere James Mahoney in a Congressional climate briefing held in Washington, DC, and hosted by the Environmental and Energy Study Institute (EESI). Several Congressional Members and over a hundred of their staffers attended the briefing. Dan described “knowns and unknowns” about climate science. VADM Lautenbacher and Dr. Mahoney described NOAA and national interagency research activities on the topic of climate, in the context of the President’s Climate Change Research Initiative.

and attended by personnel from the NWS field offices on August 29 at UCAR in Boulder. George Kiladis also lectured in the series... In August, George Kiladis attended the Climate Variability & Predictability Program Pacific Implementation Panel meeting in Seattle, WA.

- **Invited Lectures and Seminars:** On June 10, Ravi delivered the lecture for the opening of the Atmospheric Chemistry Department at Cambridge University in Cambridge, U.K... On May 9, David Parrish presented a seminar titled “Air pollutant measurements from the NOAA WP-3D aircraft: Analytical chemistry at parts-per-trillion levels in 1 second at 360 km/h” at Humboldt State University in Arcata, CA.

- **To Media:** Stephen Reid participated in a press conference on “Midlatitude Stratospheric Ozone Loss: Chemistry and Dynamics” at the Spring AGU meeting in May... Steve Brown was featured in a front-page article of the *Front Range TechBiz Journal* on receiving the Presidential Early Career Award... Aeronomy Lab scientists and their colleagues were “in the spotlight” this spring and summer, when the media gave extensive coverage to field missions occurring in the spring (the Intercontinental Transport and Chemical Transformation mission based in Monterey, CA) and summer (the New England Air Quality Study involving the R/V *Ronald H. Brown* and ground

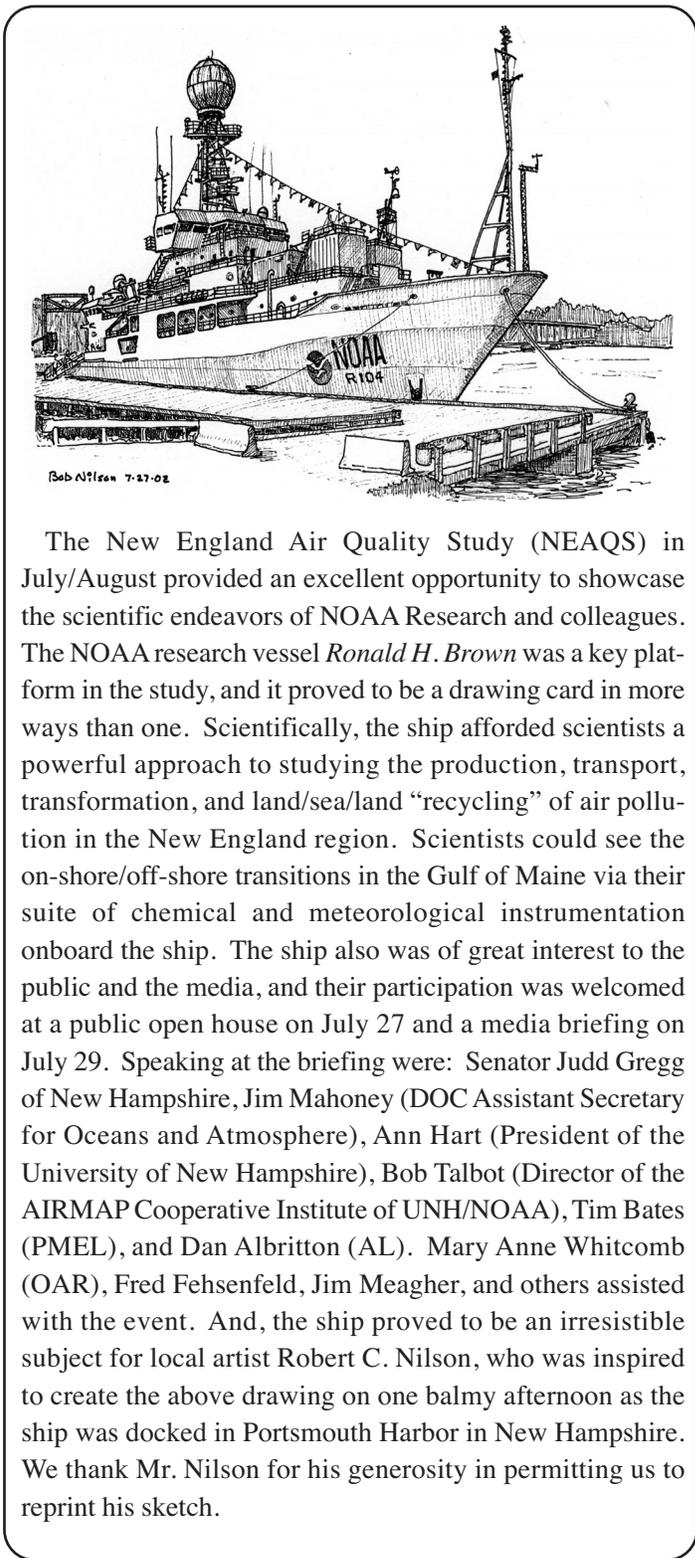
sites, and the Cirrus Regional Study of Tropical Anvils and Cirrus Layers - Florida Area Cirrus Experiment based in Key West, FL). A few examples: The ITCT mission was described in an extensive segment that aired on CNN. Print coverage of ITCT, NEAQS, and CRYSTAL-FACE has included articles in the *Christian Science Monitor*, *Chemical and Engineering News*, *The Miami Herald*, *The Boston Globe*, *Spectrum*, and *Monitor Time*; extensive additional local/regional coverage occurred on television, the radio, and in print.

- **To Industry:** On June 4, Ken Gage and Barbara Herrli attended the Management Review Board meeting for the Cooperative Research and Development Agreement (CRADA) for Boundary Layer Radar, sponsored by Sonoma Technology, Inc., in Petaluma, CA... Dan Albritton gave a plenary address on climate change knowns and unknowns at an August 4-5 workshop sponsored by the Electric Power Research Institute for CEOs of the electric power industry. The workshop, held in San Diego, CA, focused on the policy-relevant science and technology aspects of air quality and global climate, and knowledge needs to inform decisionmakers.

- **To the Public:** Dennis Nicks gave a seminar on air pollution to the Kiwanis Club of Boulder on June 13 in Boulder.

- **To Our Visitors:** During May 9-10, Dan Albritton and Chris Ennis met with Judy Nyquist (the National Research Council's Associate Program Director) and John Schmidt (NOAA's former NRC Program Representative)... James Mahoney visited the Boulder-OAR labs, the National Geophysical Data Center, the NWS, and MASC to discuss NOAA and the interagency climate research initiative on May 16-17. Dan Albritton, Fred Fehsenfeld, Jim Meagher, and Susan Solomon hosted Dr. Mahoney during his visit at the Aeronomy Lab... On June 27, Fred Fehsenfeld briefed Sam Bodman, Deputy Secretary of Commerce, on understanding and forecasting air quality... On August 2, Susan Solomon hosted a visit of IPCC Chairman Rajendra K. Pachauri to the Aeronomy Laboratory... Dan Albritton met with Kathryn Parker and Kevin Rosseel of the Environmental Protection Agency, concerning climate science communications, on August 7... National Science Council of Taiwan members Shaw Liu, Tine Yang, and Mr. Yana met with Fred Fehsenfeld and several others at AL and other Boulder OAR labs on August 20.

- **Through Service on Scientific Panels and Boards:** David Fahey attended the NASA Panel Review meeting in Washington, DC, in late May, to evaluate proposals for a forthcoming Arctic stratospheric ozone research mission... From May 22-24, Joanne Mordhorst chaired the OAR EEO/Diversity Advisory Committee meetings held in Seattle, WA... In June, Cathy Burgdorf attended the Technical Committee on Computing Resources (TCCR) meeting held in Seattle, WA... On July 7 to 10, Adrian Tuck participated in the Core Strategic Measurements for Atmospheric Science steering committee meeting in London, England... Adrian Tuck attended the National Environmental Research Council Steering Committee meeting in London in mid-July... On July 25-26, Susan Solomon chaired the NOAA OAR Headquarters Panel Review in Silver Spring, MD. She also participated in the IPCC Meeting in Geneva, Switzerland in early August. And on August 10, she presented a report to the National Academy of Sciences Committee on Nomination and Election in the 21st Century.



The New England Air Quality Study (NEAQS) in July/August provided an excellent opportunity to showcase the scientific endeavors of NOAA Research and colleagues. The NOAA research vessel *Ronald H. Brown* was a key platform in the study, and it proved to be a drawing card in more ways than one. Scientifically, the ship afforded scientists a powerful approach to studying the production, transport, transformation, and land/sea/land “recycling” of air pollution in the New England region. Scientists could see the on-shore/off-shore transitions in the Gulf of Maine via their suite of chemical and meteorological instrumentation onboard the ship. The ship also was of great interest to the public and the media, and their participation was welcomed at a public open house on July 27 and a media briefing on July 29. Speaking at the briefing were: Senator Judd Gregg of New Hampshire, Jim Mahoney (DOC Assistant Secretary for Oceans and Atmosphere), Ann Hart (President of the University of New Hampshire), Bob Talbot (Director of the AIRMAP Cooperative Institute of UNH/NOAA), Tim Bates (PMEL), and Dan Albritton (AL). Mary Anne Whitcomb (OAR), Fred Fehsenfeld, Jim Meagher, and others assisted with the event. And, the ship proved to be an irresistible subject for local artist Robert C. Nilson, who was inspired to create the above drawing on one balmy afternoon as the ship was docked in Portsmouth Harbor in New Hampshire. We thank Mr. Nilson for his generosity in permitting us to reprint his sketch.

DOWN THE ROAD

December 6-10: AGU 2002 Fall Meeting, with Special Sessions on ITCT and the Texas Air Quality Study, to be held in San Francisco, CA.

 *On the Air!* is a quarterly publication of the NOAA Aeronomy Laboratory. It is posted on the World Wide Web at www.al.noaa.gov. Please send comments, suggestions, or questions to: Chris Ennis (phone 303-497-7538; email: Christine.A.Ennis@noaa.gov).